

TABLE OF OUTSTANDING SOLAR-TERRESTRIAL  
EVENTS IN 1954 THROUGH 1967

Yukio Hakura\*

NASA-Goddard Space Flight Center  
Greenbelt, Maryland 20771

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\*Senior Research Associate, National Academy of Science-National Academy  
of Engineering, Radio Research Laboratories, Tokyo, Japan.

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Outstanding solar-terrestrial events observed in 1954 through 1967 are given in the present table. Solar flares, solar radio outbursts of type IV, Polar Cap Absorptions (PCA's), and geomagnetic storms are included.

Solar flares associated with radio outbursts of type IV.

The onset time in U. T., the heliographic location of the center, and the importance of a flare associated with a well-defined type IV outburst are shown in the left side of the table, along with the importance of the outburst. An outburst of importance A is fully developed and very intense, while those of importances B and C are of medium and minor scale, respectively.

PCA events.

The onset time, the delay-time from the associated flare  $\Delta t_a$  in hours, the approximate duration in days, the importance, and the type of a PCA are given in the middle of the table. The importance of PCA is determined from fmin indices (Hakura, 1968). PCA's are classified into three types, i.e. F-type ( $\Delta t_a < 8$  hours), S-type ( $\Delta t_a \geq 8$  hours), and others (no associated type IV-flare). The sign

\*Senior Research Associate, National Academy of Science-National Academy of Engineering, Radio Research Laboratories, Tokyo, Japan.

G stands for a  $\sim 10$  Bev proton event.

Geomagnetic storm.

The onset time, the delay from the associated flare  $\Delta t_m$  in hours, the importance, and the type of a geomagnetic storm are given in the right side of the table. SSC means a sudden commencement geomagnetic storm, SI a sudden impulse, and SG a gradual geomagnetic storm.

REFERENCE

Hakura, Y., Polar Cap Absorptions and Associated Solar-Terrestrial Events Throughout the 19th Solar Cycle, NASA TN-4473, 1968.

Year	Month	Solar Flare with Type IV Outburst					Polar Cap Absorption						Geomagnetic Storm				
		Onset Date	Time	Position	Imp.	Imp. of Type IV	Onset Date	Time	$\Delta t_a$ (hrs)	Duration (days)	Imp.	Type	Onset Date	Time	$\Delta t_a$ (hrs)	Imp.	Type
1954	V VIII						1 19	0200		3 13	I I						
1955	I						16			2	II		17	0322		II	SSC
	II						1	0900		1/2	I						
	XI						19	1200		1/2	I		19	1319		II	SSC
	XII						6	0400		1	I		5	2216		I	SSC
1956	II	14	0541			B											
	II	23	0334	N23W74	III+	A	23	0415	0.7	3	III	G, F	25	0307	48	III+	SSC
	III						10	1400		7	II		10	1058		II	SSC
	IV						15	0100		1	I		15	1628		I	SI
	IV	27	2100	N15W34	II	C	27	2200	1	1	II	F	30	0138	53	III	SSC
	V						14	0500		1	I		13	2222		III	SSC
	VIII						28	2300		1	I						
	VIII	31	1228	N18E12	III	A	31	1500	2.5	4	III	F	IX/02	0230	38	III+	SSC
	XI						8			3	I		9	2030		III	SSC
	XI	13	1431	N16W10	II	C	14	0000	9.5	3	II	S	15	0807	42	III	SSC
	XII						25			3	I		25	0754		I	SSC
1957	I	(20	1116	S25W18	III)		20	2215		4	II		21	1255		III	SSC
	II	(21	1605	N13W40	III+)		21	1800		3	II		23	1807		III+	SSC
	III						28	0900		2	I		29	0336		I	SSC
	IV	3	0825	S15W60	III	C	3	1015	2	7	III	F	5	1436	54	II	SI
	IV						11	1300		7	II						
	IV	16	1048	N32E90	II	C							17	2332	37	I	SI
	IV	17	2000	N12E70	III+	C											
	V						19	0200		3	I		18	1508		III+	SSC
	V						5	0200		2	I						
	V						8	0100		4	I						
	V						30			3	I						
	VI	19	1608	N20E46	II	C	19	2215	6	6	III	(F)	30	0822		II	SSC
	VI	(22	0236	N23E12	II)		22	0500		6	III		24	0340		II	SSC
	VII	3	0712	N14W40	III+	B	3	0930	2	4	III	F	5	0042	42	III	SSC
	VII	16	1740	S33W28	III	C	19			2	I		19	0519	60	I	SSC
	VII	24	1816	S24W22	III	C	24	2015	2	1	I	F	27	1959	74	I	SSC
	VII	(28	1346	S24W75	III)		28	1500		1	I						
	VIII	(9	0609	S09E75	II)		9	1500		3	II		12	1135		III	
	VIII	28	0913	S30E35	III+	C	28	2230	13	>3	III	S	29	1920	34	III	SSC
	VIII	31	1257	N20W02	III	C	31	1415	1.5	>3	III	F	IX/2	0314	38	III+	SSC
	IX	2	1257	N11W26	I+	B	2	1500	2	3	III	F	4	1300	48	III+	SSC
	IX	11	0243	N11W03	III	B	12	08	29	2	I	S	13	0046	46	III+	SSC
	IX	12	1520	N10W19	II	C	12	Masked			I						
	IX	19	0400	N23E01	III	C	19	08	4	2	I	F	21	1005	54	III+	SSC
	IX	21	1340	N10W08	III	C	21			3	II	F	22	1345	24	III	SSC
	IX	26	1907	N26E15	III	C	26	2315	4	2	I	F	29	0016	53	I	SSC
	X	20	1637	S25W45	III+	B	21	05	12	2	II	S	21	2241	30	II	SSC
	XI	(5	0203	N38W63	II)		5	0700		1.5	I		6	1821		III+	SSC
	XI	24	0850	S13E37	III	C							26	0513	44	II	SSC
	XII	13	0215	N22E90		C											
	XII	14	1100	(N17E75	II)	C											
	XII	17	0734	N22E44	II+	C	17	1200	4.5	1	I	F	19	0937	50	II	SSC
1958	II	9	2108	S13W14	II	A	10	0700	10	2	II	S	11	0125	28	III+	SSC
	III	1	0340			C							3	0931	54	I	SSC
	III	(11	0048		III)		11	0500		2	II		14	1212		I	SSC
	III	14	1508	S23W80	III	C	14	1600	1	2	II	F	17	0750	65	I	SSC
	III						18			16	II		17	0751		I	SSC
	III	23	0950	S14E77	III+	B	25	08	46	>8	III	S	25	1540	54	I	SSC
	IV						10	06		3	II		11	2140		I	SI
	VI	4	2140	N15W58	II	C	5	04	6	2	I	F	7	0046	51	III	SSC
	VI	6	0436	N15W77	III	C	6	1345	9	2	I	(S)	8	1728	61	I	SSC
	VI	26	0300	N10E49	II+	B							28	0713	52	I	SSC
	VII	7	0039	N24W09	III+	B	7	0200	1.5	6	III	F	8	0748	51	III+	SSC
	VII	29	0303	S14W43	III	B	29	0415	1	2	I	F	31	1532	60	I	SSC

Year	Month	Solar Flare with Type IV Outburst					Polar Cap Absorption						Geomagnetic Storm				
		Onset Date	Time	Position	Imp.	Imp. of Type IV	Onset Date	Time	$\Delta t_n$ (hrs)	Duration (days)	Imp.	Type	Onset Date	Time	$\Delta t_n$ (hrs)	Imp.	Type
1958	VIII	16	0432	S14W53	III+	A	16	0715	2.5	3	III	F	17	0622	26	III	SSC
	VIII	20	0043	N16E23	III	C	21	1445	38	>1	II	S	22	0227	50	II	SSC
	VIII	22	1417	N18W09	III	C	22	1530	1	>4	III	F	24	0140	35	III	SSC
	VIII	26	0005	N20W54	III	A	26	0215	2	4	III	F	27	0303	27	III	SSC
	IX	14	0830	S10W71	III+	C	14	1045	1	1	I	F	16	0930	49	III	SSC
	IX	(22	1012	N17W65	II-)		22	1430	2	3	II		25	0408		III+	SSC
	X	21	2330	S02W20	II	B							22	20--	21	III	
	X	24	1440	S04W57	III	C							27	1523	70	III	SSC
	XII	12	1300	S05W07	II	C							13	1148	23	III+	SI
	XII	23	0540	S16E65	III	C							25	2330	66	II	SI
1959	I	7	0245	S12W03	I	C							9	1459	60	III	SSC
	I	(26	0013	N09W42	II)		26	14		2	I		27	1329	37	I	SSC
	II	9	0200	N13E90	II	C							11	0318	49	II	SSC
	II	12	2300	N12E48	III+	C	13	10	11	4	I	S	14	1142	37	II	SSC
	V	10	2055	N23E47	III+	B	11	0130	4.5	13	III	F	11	2328	27	III	SSC
	V	11	2010	N08E39	II+	C	Masked				III	F	12	1537	20	II	SI
	V	13	0510	N22E26	II	C	Masked				III	F	15	0703	50	II	SSC
	VI	09	1651	S20E00	III+	B	(10	0045	8	1	I	S)	11	0909	40	I	SSC
	VI	(13	1051	N17E27	II)		13	13		4	I						
	VII	9	2030	N18E67	I	B											
	VII	10	0210	N22E70	III+	A	10	0615	4	>4	III	F	11	1625	38	II	SSC
	VII	14	0342	N16E07	III+	A	Masked			>3	III	F	15	0803	28	III+	SSC
	VII	16	2115	N08W26	III+	A	Masked			9	III	F	17	1638	19	III	SSC
	VIII						2			4	I	F					
	VIII	14	0130	N12E28	II+	C							16	0404	50	III+	SSC
	VIII	18	1022	N11W34	III	C	18	13	12.5	2	II	F	20	0412	42	I	SSC
	IX	01	1924	N12E60	II+	C							03	1417	43	I	SSC
	XI	30	0250	N08E16	II	B											
	XII	21	0050	S03W53	I	C	(21	(06)	(5)	1	I-	F)	23	1525	62	II	SSC
1960	I	11	2040	N23E05	III	C	12			2	I		13	1859	46	II	SSC
	I	15	1340	S20W66	II	C							16	2114	31	I	SSC
	III	29	0650	N12E31	III	A	30	1000	27		I	(S)	31	1036	52	III+	SSC
	III	30	1520	N11E15	II+	B	cont after SID			>2	III	F	31	2142	30	III+	SSC
	IV	1	0845	N13W09	III	C	1	1000	1	>4	III	F	2	2313	39	III	SSC
	IV	5	0215	N12W62	III	A	5	10	8	2	II	S	6	1628	39	I	SI
	IV	28	0130	S05E34	III	C	28	0400	2.5	1	II	F	30	0132	48	II	SSC
	IV	29	0209	N10W22	III	A	29	0600	4	3	III	F	30	1213	32	III+	SSC
	V	4	1015	N12W90	III	B	4	1045	1/2	1	I	G,F	6	1719	55	II	SSC
	V	6	1404	S10E08	III+	C	6	2030	6	3	III	F	8	0421	42	II	SSC
	V	(9	0704	S10E55	III+)		9	11		2	II		11	0435		II	SSC
	V	12	1340	N30W60	I	C	12			1/2	I	F					
	V	13	0522	N30W64	III+	A	13	0845	3	2	II	F	16	1351	80	II	SSC
	V						17	21		1	I						
	V	26	0851	N14W15	II	C	26			3	I		28	2029		I	SI
	VI	1	0830	N28E46	III+	C	1	12	3.5	5	II	F	3	1731	57	II	
	VI	25	1200	N22E05	III	C							27	0145	38	IV	SSC
	VI	25	2040	N18W04	III	C							27	1630	44		
	VI	27	0010	S7E35	III	C											
	VI	27	2140	N17W28	III	C	28			2	I		29	1939	46	III	SSC
	VI	29	0140	N23W56	I	C							30	1720	40	II	SSC
	VIII	11	1920	N22E27	III+	C	13			10	I		14	1510	68	I	SSC
	IX						26			4	I						
	IX	3	0037	N20E87	III	B	3	08	7	8	III	F	4	1158		II	SSC
	IX	16	1710	S21E66	I	C							4	1145	37	III	SI
	IX	26	0530	S19W64	II+	C	26	08	2.5	4	II	F	29	0836	75	II	SSC
	X						4	1600		4	II		6	0237		III+	SSC
	X	11	0520	S18W36	II	C							13	2147	64	I	SI
	X	29	1020	N22E26	III	C	29			3	I						
	XI	10	1010	N29E28	III	B							12	1325	51		
	XI	11	0315	N29E12	II+	A	11	04	1	1/2	I	F	12	1846	40	III+	SSC
	XI	12	1323	N27W01	III+	B	12	1515	2	>3	II	G,F	13	1021	21	III+	SSC
	XI	14	0246	N27W19	II+	A	14	Masked			II	F	15	1304	34	II	SI
	XI	15	0207	N26W32	III+	A	15	03	1	>6	III	G,F	15	2155	20	III	
	XI	20	2017	N25W>90	I	B	20	2300	3	5	III	F	21	2147	26	II	SI
	XII	(5	1825	N27E68	III+)		8			2	I		7	1804	48	II	SSC

Year	Month	Solar Flare					Polar Cap Absorption						Geomagnetic Storms				
		Date	Time	Position	Imp.	Type IV	Date	Time	$\Delta t_a$	Duration	Imp.	Type	Date	Time	$\Delta t_m$	Imp.	Type
1966	III	24	0225	N18W37	III B		24	(03)	(0.5)	1	I	F	24	2337	21	I	SSC
	V	2	0808	N21E66	II B		14	06		5	I-		24	1355		I	SSC
	VI						24	04		1/2	I-		8	2102	45	III	SSC
	VI	7	0026	N34W48	II B	A	7	0120	(1)	4	II	F					
	VII						17			1	I-		29	1315	22	III	SSC
	VII						28	16 ~ 17	(1)	4	III	F	3	1027	29	III	SSC*
	VIII	28	1522	N23E04	III B	A	28	0730	2	5	III+	F					
	IX	2	0548	N23W55	III B	A	2	<14		2.5	I-	F					
	IX	(14)	1014	S20W90	II B)		14										
1967	I	3	0302	N09E61	II B		28	<04		>6	III+	S	04	1134	33	II	SSC
	II	13	1746	N22W10	III B	C	3	<18	<15	2	I-		15	2348	54	III+	SSC
	II						13			2	I-		13	0834		II	SSC
	III	(11)	1011	S20W80	I- )		11	14		1	I-		24	1725	23	III+	SSC
	V	23	1835	N28E24	III B	B	23			>4	III		30	1426	57	III	SSC
	V	28	0525	N28W32	III B	C	28			3	II						
	VI	5	1858	S20W58	II B		6	7	12	3	I	S	Masked				

Year	Month	Solar Flare with Type IV Outburst					Polar Cap Absorption					Geomagnetic Storm					
		Onset Date	Time	Position	Imp.	Imp. of Type IV	Onset Date	Time	$\Delta t_a$ (hrs)	Duration (days)	Imp.	Type	Onset Date	Time	$\Delta t_m$ (hrs)	Imp.	Type
1961	II						13			1	I		13	0253		II	SSC
	II						18			4	I		16	0536		II	SSC
	III						17			3	I		Kp	>5		I	SSC
	IV						14			1	I		13	1450			
	VI-VII						VI/4			36	I						
	VII	11	1654	S06E32	III	B	11	2000	3	1	II	F	13	1113	42	III+	SSC
	VII	12	1000	S08E22	III+	B	12	1115	1	6	III	F	13	1113	25		
	VII	15	1520	N15E17	III	C	Masked				III	F	17	1825	51	III	SSC
	VII	18	0921	S06W59	III+	B	18	Masked		5	III	F	20	0248	41	I	SSC
	VII	20	1600	S05W90	II	B	20	1000	1	5	II	F	26	1950	63	III+	SSC
	VII	24	0450	N15E18	III+	C	24	Masked		7	II	F					
	VII	28	0230	N10W37	II	C											
VIII							1		23	I		1	22.8		II	SG	
IX							7		2	I							
IX	10	1950	N08W80	I	C	10	2315	3.5	2	II	F	13	1554	68	I	SSC	
IX	28	2208	N13E30	III	B	14	2315	1	15	I		13	1554		I	SSC	
IX	10	1434	N09W90	I+	C	28	1515	0.7	7	III	F	30	1847	45	III+	SSC	
XI						10			2	II	F						
1962	II	1	0902	N10W35	II	C	1	2030	11	2	II	S	4	0930	72	II	SI
	II						5		1	II							
	III	1	1640	S14W56	II+	C											
1963	IX	27	1505	N09W10	I-	C	6		9	I			7	2026		I	SSC
	II																
	IV	15	1034	S10W07	II	C	9	1845		8	I		9	2232		III	SSC
	V	1	0525	N15E46	II	C	15	1215	2	4	II	F	19	0317	89	I	SSC
	V						1	1200	7	3	I	(F)	2	2219	41	I	SSC
	VIII	6	0855	N13W11	II	C	29			4	I-		27	2028		I	SSC
	VIII	9	2234	N07W80	I	C	6	1115	2	2	I	F					
	IX	15	0015	N15E75	II	A	9	(2315)	(0.7)	2	I	S	16	2229	46		SSC
	IX	16	1430	N12E50	II+	B	15	1030	10	>1.5	I	F	19	0543	63	I	SSC
	IX	18	2230	N12E17	I	B	16	1600	1.5	>2	I	F	21	1413		III+	SSC
	IX	20	2350	N10W09	II+	A	19	0543	7	2	I	F	22	1601	40	III+	SSC
	IX	26	0638	N13W78	III	B	21	0300	3	3	III	F	27	1942	37	II	SSC
	X	28	0230	N11W25	III	B	26	1115	4.5	7	II	F	27	1942			
	X						12			1	I		11	12			
	X						28	0815	6	2	I	F	29	1359	36	III	SSC
	1964	III	16	1553	N06W75	II+	B										
1965	I																
	II	5	1753	N07W25	II	C	10	0900	1	1	II	(F)	6	1414	20	II	SSC
	X	4	0937	S21W30	II	B	(5) 4	1840 1200	2.5	1/2	I-	F	7	0859		I	SSC